Correlation between Salmonella and hygiene indicators in the Danish fresh pork chain

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Correlation between *Salmonella* and hygiene indicators in pork cuttings in the Danish fresh meat chain

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Background:

Salmonella **in pork pose a significant consumer risk and hygiene performance during handling in all parts of the fresh meat chain will potentially contribute to the safety of the meat. Recently, it has been shown that *Salmonella* was significantly more prevalent in pork cuttings in butchers' shops than in supermarkets in Denmark (Hansen *et al*., 2010). This may be due to differences in hygiene performance between type of retailer or between their suppliers.**

Aim:

To investigate for a correlation between occurrence of *Salmonella* and the hygiene indicators Enterococci and *Enterobacteriaceae* in cutting plants and at retail in Denmark.

Conclusions:

Cutting:

1. ***Salmonella*** **output vary between cutting plants**
2. **Large cutting plants performed significantly better than small**
3. ***Salmonella*** **14 times more likely to occur if enterococci >10.000 CFU/g (CHI^2: *P* = 0.007)**

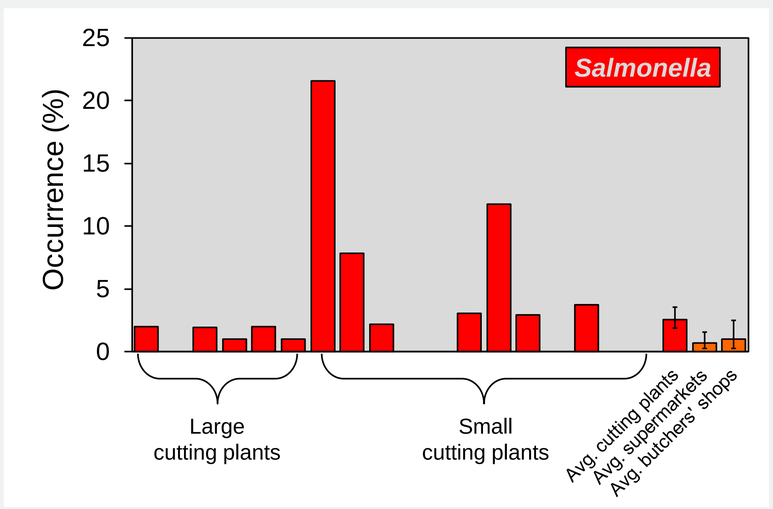
Retail:

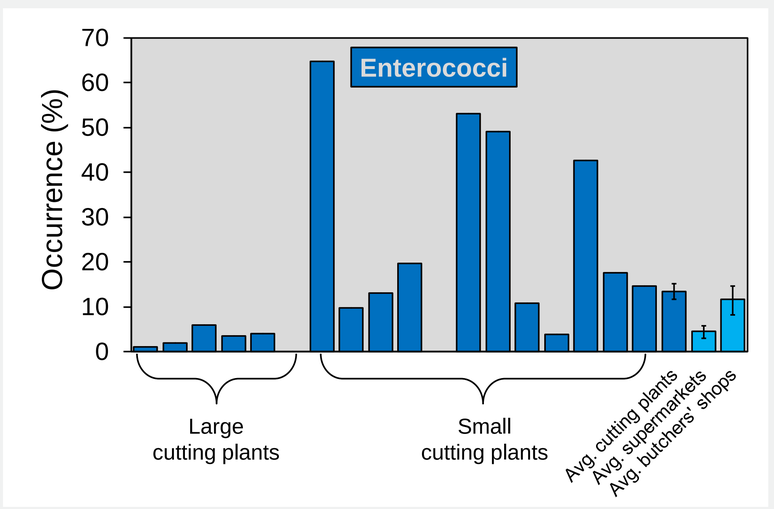
1. **Butchers' shops have lower level of hygiene (enterococci)**
2. ***Salmonella*** **more frequently found in butchers' shops**
3. ***Salmonella*** **6 times more likely to occur if enterococci >100 CFU/g (CHI^2: *P* = 0.028)**

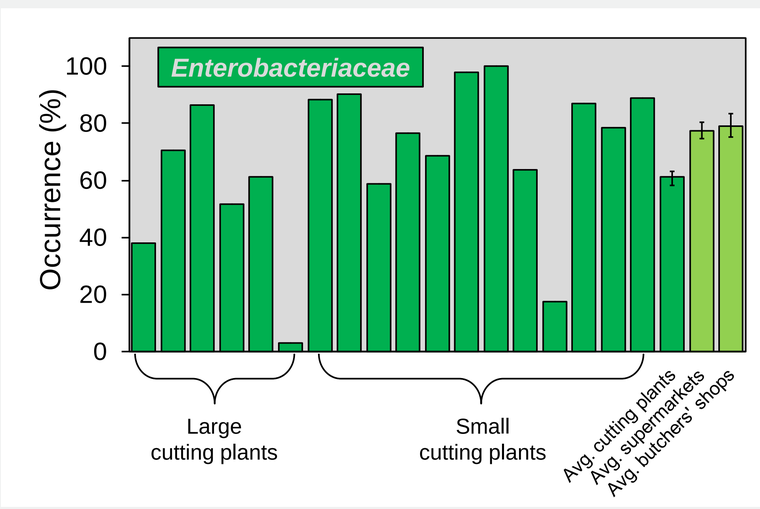
Overall:

1. **Correlation between *Salmonella* and enterococci**
2. **Correlation may be due to growth of both organisms in cutting plants and at retail**
3. **Enterococci a candidate for a process hygiene criteria at cutting and at retail**
4. ***Enterobacteriaceae*** **displayed less variation between companies with a significant weaker correlation to presence of *Salmonella* than enterococci**

Results:

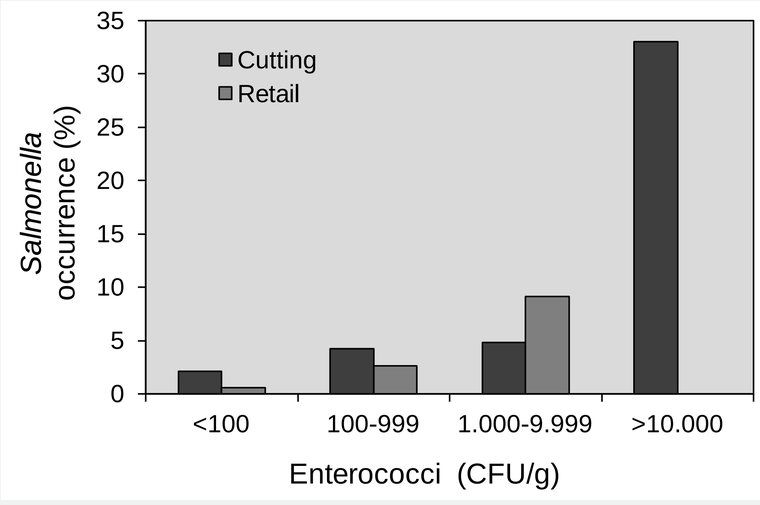






Experiment:

- **Cutting plants: 1,578 samples of pork cuttings were obtained from 6 large and 12 smaller cutting plants.**
- **Retail: 1,241 meat samples were obtained from 278 supermarkets and 134 butchers' shops.**
- **Analyses: Samples were analysed semi-quantitatively for *Salmonella* and quantitatively for enterococci and *Enterobacteriaceae* by standard culture procedures.**
- **All sampling and analyses were performed by the Danish Veterinary and Food Administration.**



References:
Hansen, T.B., Christensen, B.B., and Aabo, S. (2010) *Salmonella* in pork cuttings in supermarkets and butchers' shops in Denmark in 2002 and 2006. Zoonoses and Public Health, Zoonoses Public Health. 2010 Nov, 57 Suppl 1:23-9. doi: 10.1111/j.1863-2378.2010.01360.x.

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